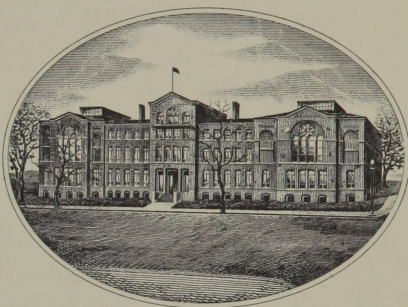


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with Dr. Gray's
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SELECTIONS
FROM THE
SCIENTIFIC CORRESPONDENCE
OF
CADWALLADER COLDEN.

SELECTIONS
FROM THE
SCIENTIFIC CORRESPONDENCE
OF
CADWALLADER COLDEN
WITH
GRONOVIVS, LINNÆVS, COLLINSON,
AND
OTHER NATURALISTS.

ARRANGED BY
ASA GRAY, M. D.

FROM THE AMERICAN JOURNAL OF SCIENCE AND ARTS.

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SELECTIONS, &c.

DR. COLDEN, one of the earliest and most distinguished cultivators of science in North America, maintained, as is well known, an active correspondence with many of the most eminent men both in Europe and this country, on medical, philosophical, and scientific subjects, devoting to these pursuits the intervals of his public duties, as surveyor-general and member of the council, and, at a later period, as lieutenant and acting governor of the province of New York. Some of his letters and other papers on mathematical and philosophical subjects, in which he was particularly skilled, have been given to the public.* But, so far as I am aware, no part of his botanical correspondence has yet been published, excepting his two letters to Linnæus, which are included in the agreeable volumes edited by Sir James E. Smith.† Supposing that other botanical papers of equal interest might be brought to light, I availed myself of the permission kindly accorded me by David C. Colden, Esq. of New York, to examine the voluminous correspondence of his celebrated ancestor, and to select some portions for publication. I trust that these contributions to the early history of science in this country, will not be deemed inappropriate to the pages of the *American Journal of Science*.

Although Dr. Colden had acquired the rudiments of botany, as taught in the University of Edinburgh at the beginning of the last century, yet he paid little attention to the subject for twenty or thirty years after his arrival in this country. But having casually obtained some of the earlier writings of Linnæus shortly after their appearance, he zealously engaged in the examination of the plants around him, according to the new system, and soon established a correspondence with Gronovius of Leyden, Peter

* Vide *American Medical and Philosophical Register*, Vol. I, (1810,) which contains a spirited biographical memoir of Gov. Colden, from the pen of Dr. Francis; and *Sparks, Works of Benjamin Franklin*, Vol. VI, (1838,) *passim*.

† *A Selection of the Correspondence of Linnæus and other Naturalists, from the original manuscripts*, Vol. II, p. 451-458.

Collinson of London, and, a few years later, with the great reformer of natural history himself.

I have not been able to find any draft of Dr. Colden's first letter to Gronovius, (acknowledged in the subjoined epistle from that botanist,) in which he transmitted a detailed description of the plants growing around his country residence at Coldenham, (near Newburgh,) New York. This communication was afterwards sent by Gronovius to Linnæus, who, in the year 1749, published the first part of it (to the end of class *Polyandria*) in the Transactions of the Royal Society of Science at Upsal, under the title of *Plantæ Coldenhamiæ, in provincia Noveboracensi Americæ sponte crescentes, quas ad methodum CL. LINNÆI sexualem, anno 1742, &c. observavit et descripsit* CONWALLADER COLDEN. This early attempt at the systematic arrangement of our plants is really an extraordinary performance, considering the circumstances under which it was prepared, and fully merits the praise which Linnæus and Gronovius bestowed upon it. The plants are described with great accuracy and scientific skill; their medicinal uses indicated, and several new genera are proposed, although not named. The *magnitude* of this treatise is, however, greatly and strangely overstated by Colden's successor, the late occupant of the gubernatorial chair of New York; for instead of *filling two quarto volumes*, as Governor Seward gravely states, in his elaborate *Introduction* to the Natural History of New York, it actually occupies about twenty pages!

To Dr. Colden's first letter, Gronovius replies (in English) as follows:

GRONOVIVS TO DR. COLDEN.*

Leyden, August 6th, 1743.

SIR—The 29th of July I was favored with your kind letter of the 28th of March, 1743, which came to my hand (by the care of Doctor du' Bois,) by the Rev. Mr. Dorsius; who told me, that in a short time he was resolved to go back to Pennsylvania; wherefore I shall answer to your letter as much as the time will permit.

Mr. Clifford, one of the richest merchants at Amsterdam, has printed his *Hortus* at his own expense, and doth not sell any copy, but is very liberal in making a present of it; so that if you

* The orthography in these letters has been corrected and modernized, but the phraseology is strictly adhered to.

can collect some seeds for him, I do not doubt he will present you with a copy of it. Sometimes it is to be met with in a public auction, where it commonly goes for about twenty five guilders.

The second part of the *Flora Virg.* is printed, of which I take the liberty to send to you a copy, besides a copy of the first part. But as you make no mention in your letter of some other books of Linnæus, besides his *Characters*, I take the liberty to present you with some other books, which you will find of great use to you, viz. with a new edition of his *Fundamenta Botanica*, in which you will find a great thesary of learned observations; but this book must be read over and over, and then you will easily perceive the laws which must be observed in making the characters, particularly about the *partes fructificationis*, where the *numerus, figura, proportio, et situs*, always must be observed.

I am infinitely obliged to you for the plants and characters you are so kind as to communicate to me. At present I am very much taken up with the public affairs, and the short staying of the Rev. Mr. Dorsius is the cause that I cannot examine your characters. What [can] I hope to do when our 20,000 men for assistance of the queen of Hungary, are marching, being about these affairs not only the seven provinces, but the towns themselves divided in their opinions! However there is great hope to a general agreement.

However, in reading now and then for a moment your characters, I am (without any flattery) surprised how you, in such a short time, could have such ideas of Linnæus's way in making up the *notas characteristicas*. Linnæus hath promised to give out one time or another the *Philosophia Botanica*, which should only consist of an explication upon the *aphorismi* of his *Fundamenta*; so that this book should be as a standard. A part of it is printed in the *Critica Botanica*, wherein certainly you shall find exceeding good remarks; wherefore I take the liberty to present to you my own copy of that book, which I have more than fifty times read over and over. I do not doubt you shall find by reading nicely the *Fundamenta*, the preface to the *Characters*, and this *Critica Botanica*, you may easily make yourself master of Linnæus's way. For myself, I assure you, I cannot give to you better directions. But if it is that you have still some scruples, I shall always be ready to answer them as much as I can.

Dr. Linnæus is not only content with his botany, but he extends his industry to all parts of natural history, and has brought me over to it, particularly persuaded by the power of my family, and I myself, too, in the government of this town, and by that way now and then departs to the states of Holland and other colleges. I get by our men of war an immense collection of natural things, of which my chiefest delight is in the *Lapides* and *Testacea*, that is, the *conchæ et cochleæ*.

I have tried *juxta Linnæi Fundamenta Botanica*, to give names to all these things, and printed a catalogue of it in the year 1740; since which time my collection increased once larger. You shall infinitely oblige me if you meet some of these things, to communicate them to me; particularly the *cochleæ* and *conchæ* of your country. I don't doubt there is in your country a good variety of snails, (as well at land as to the rivers,) whose *cochleæ* shells are different in shape and colors.

Now, sir, once more, I shall acknowledge myself very much obliged to you for your letter and characters, assuring that I shall always be glad to see your letters, to which I shall always answer upon [the] spot. Direct only to Mr. Sadelhof, merchant at Amsterdam, or to Mr. John Papin, junior, merchant at Rotterdam, with a direction to Dr. John Frederic Gronovius, Senateur de la Ville de Leyden, in Holland.

I am, dear sir, wishing you all health and prosperity, your most obedient servant,

JOH. FRED. GRONOVIVS.

Leyden, October 3d, 1743.

SIR—The before-mentioned Mr. Dorsius hath told me that he was resolved in short time to go over to Pennsylvania, and promised me that he should call upon me and spend a night; whereupon I wrote these preceding lines, and made a packet of things mentioned there. To my great sorrow I did not hear any thing of that gentleman. In the mean time, I resolved to fix daily some hours to consider your characters. Once for all you must know that I [am] one who never will flatter any one; but with father Plinius *agnoscere per quem profecerim*. Indeed, I must confess, I hath [obtained] a great deal [of] light in your characters, about some plants mentioned in the *Flora Virginica*.

I take the liberty to send you my remarks, which have been ready a month ago, when I hath made this packet ready, that at the approach of Dorsius I could give it immediately in his

hand, but alas! the fellow did not come; so that I was a whole month disappointed, having been very sorroy that I going to bed saw the packet lying in my room, and the next morning coming in my room, I saw it still lying there; till it happened that Mr. Otto, a gentleman from advised me of his going to England, who promised me to give it there in good hands.

I remain, dear sir, your most obedient servant,

JOH. FRED. GRONOVIVS.

GRONOVIVS TO DR. COLDEN.

Leyden, April 3d, 1744.

DEAR SIR—A month ago, I hath the pleasure that my particular friend, Mr. Canwan from St. Christopher, going to London, did me the favor, to take a small packet with him, directed to you, in order to look there for an occasion to send it to you. In the same packet you will find an answer to your characters, the *Fundamenta Botanica* of Linnæus, and his *Critica*, with the second part of the *Flora Virginica*, and my *Index Supellectilis*.

Since I have found that your characters, of which you send me a specimen under number 19, is responding to the *Diervilla*, but I believe a quite different species. In the mean time I had an occasion to write to my good friend Linnæus, and to get an answer from him, of which I communicate to you some particulars.

“Literas 17 Sept. datas accepi: ex iis percepi placuisse summo arbitro novum creare in America Botanicum; si ille tam multa præstet per te ac Claytonus, erint plantæ Americanæ certiores quam Europææ; et nulla rerum vicissitudo plantas et hos botanicos unquam obliterabit.

“Videtur certe cl. Coldenus vir acuminatus et oculatissimus: hoc tamen video, quod si ipsas plantas non communicat nobiscum, minus utilis erit. Hoc vero si fecerit, erit systema sexuale, et plantarum characteres, et differentiæ tales, quales tota Germania, ne quidem Europa unquam proculeabit. Jucundissimæ mihi fuerunt observationes ejus, quas mecum communicas. Ego ad singula respondes.” * * * * [Here follow several notes and remarks upon Colden’s characters.]

These are the remarks which Dr. Linnæus hath made upon some heads of your characters, about which I have wrote to him. To satisfy him more, I left a copy for him of your characters. At the next occasion, you shall see the *Oratio Linnæi de Tellu-*

ris habitabilis incrementis, and *Celsii oratio de mutationibus generationibusque in superficie corporum cælestium contingunt*. In both of which you shall find curious observations.

I hath kept this letter with me with intention, as soon [as] the winter is gone, to send it to you. It is now the 26th of February, when our public trek-boats went the first time to Amsterdam in this winter, having had a mighty pleasant frost, only two days very severe, but no snow at all.

In the mean time, I discovered that my friend who hath the care of the before-mentioned packet, hath not done right with some other packets. I suspect the same accident may [have] happened to the packet directed to you, wherefore I send to you another copy of Linnæus's *Characters*, of the *Flora Virginica*, of the *Fundamenta Botanica*, and my *Index*, besides another copy of my remarks upon your characters. There was in the before-mentioned packet a letter to you, but having no copy of it, I hope you shall excuse me to write another. The *summa summarum* was, that I always shall be glad with your letters, and sincerely answer to them; the second part of my letter was that I am thinking and meditating for a natural system of the *cochleæ* and *conchæ*; so that I beg you will be so kind to send to me the *testæ* of the land and sea-snails which are common in your country; and if there are to be met some shells and oysters, you shall oblige me with a couple of each species.

If you have any thing for me, pray direct it to Messrs. Dan. and Bar. Van Zadelhoff, merchants at Amsterdam, by whose care you get this paper. I shall be glad to hear from you as soon as you have received these things. If I can be more of any use to you, pray command freely, your most obedient servant,

JOH. FRED. GRONOVIVS.

P. S. As you have seen that Dr. Linnæus hath desired a copy of all your characters, I have sent them to him. I hope by my next letter to you to have more of his considerations upon them, which I shall faithfully communicate to you.

The following letters exhibit Dr. Colden's just appreciation of the wide difference in character and object between an artificial and a natural classification. His proposition to arrange plants in natural groups or orders, in accordance with the *ensemble* of their

affinities, employing some strictly artificial scheme for the single purpose of arriving most readily at the name of an unknown plant, as well as his remarks upon the gradations from one class and genus to another which the natural system when discovered may be expected to present, will appear really surprising, when it is remembered that he could have read nothing upon the natural classification more modern than the *Fragmenta Methodi Naturalis*, appended by Linnæus to his *Classes Plantarum*, (1738.) These letters are copied from the original drafts preserved among the Colden papers.

DR. COLDEN TO GRONOVIVS.

[No date.]

DEAR SIR—Your favor of the 3d of April, which I did not receive until the 15th of November, has so far exceeded the fondest of my hopes, that you have thereby laid me under the strongest obligations. I was, and still am, so conscious of my want of knowledge in botany, that I with good reason apprehended it was not in my power to be of any use to you or Dr. Linnæus, both of you consummate in that science. I cannot cease to admire the unwearied diligence and surprising accuracy of Dr. Linnæus, in forming his characters of such a vast number of plants. But it is to you more immediately that we in America are indebted; and it was merely in gratitude for the benefit we in America have received from your labors, that I offered any little assistance that is in my power, and which you have now laid me under the strongest obligations to perform. I must therefore previously excuse an imputation of negligence, which I am afraid I shall hardly avoid, in not complying with all that you may justly expect from me. For, as I am in public employments, I am frequently, during the summer season, obliged to attend to them in the city, where I have neither leisure nor opportunity to examine plants. So it has happened to me these two last summers; and it was accidental that, in the summer before them, I had so much leisure to examine the plants growing near my house in the country, and to make the observations which I sent to you. I shall next summer endeavor to collect for you all the specimens which you desire; and when I meet with any other plants which I think deserve your observation, I shall send you specimens of them, together with my own observations. I thank you likewise for your present of Linnæus's *Characters*, his *Fun-*

damenta Botanica, his *Oratio de Telluris habitabilis incremento*, *Celsi Oratio*, and your *Flora Virginica*, *Index Supellectilis*; all which I have received safe. But those by Mr. Canwan I have heard nothing of.

When you write to Dr. Linnæus, pray offer my humble service to him, and assure him that I shall be very proud of receiving his commands, if in any thing I can serve him in this part of the world. Last summer I sent the characters of the *Actæa* and *Christophoriana baccifera* to my good friend Mr. Collinson of London, which I believe he was to communicate to Dr. Linnæus. It was from Mr. Collinson this spring that I learned with pleasure that you had received my letter; for I began to suspect that it was either lost, or not worth your notice.

Since you have given me so much encouragement to propose my doubts on the Linnæan system, I shall take the liberty to make them as they occur, without further ceremony, trusting to the indulgence which you have already so fully shown me; though what I now presume to make goes even to the general distribution of his system into *Hermaphroditi*, *Monœcia*, *Diœcia*, and *Polygamia*. For if there be species of plants which are evidently of the same genus, and yet according to this system must be referred to different classes, you must certainly allow it to be a fault in the system. What has given occasion to me for this doubt, is what I wrote to you before, that I had observed some particular plants of the *Clematis* that carried only male flowers, while others of the same species bore all hermaphrodite flowers. There is no doubt of these plants being of the same species, because they agreed in every thing in the leaf, in the stem, &c., so that not the least distinction could be observed, except that the flowers in one were all male, in the other all hermaphrodite; neither did I observe any other plant of the same genus that had female flowers. The next is what I likewise observed to you before of the *Sagittaria*, that the species which I observed was evidently distinguished into male and female plants. You may assure yourself it is not an *Alisma*, according to Linnæus's character of this genus, nor no new genus; but that in every thing it agrees with the character of the *Sagittaria*, excepting that the flowers are male and female in different plants of the same species. Now I shall mention a third plant, a specimen of which I sent you, though without the flowers, no. 198,

and which you tell me is the *Myrica foliis oblongis alternatim sinuatis*, Fl. Virg. p. 192.* According to Linnæus's character of the *Myrica*, it is of the *Diœcia* class; I can assure you that this species is of the *Monœcia*, and carries male and female catkins on the same plant. * * * I cannot think that I have accidentally fallen upon all the exceptions of this kind that are to be found. * * * In vegetables it is necessary that the males be in greater number than the females, in order to make sure of their impregnation; and therefore I do not think it against nature to have in the same species one plant with all male flowers, and another with hermaphrodite flowers.

One reason for Dr. Linnæus's establishing so many classes, (I suppose,) is to avoid as much as possible any of them from being too much crowded. This, I think, may be done, by dividing, as Mr. Ray and others have done, plants into trees and herbs. This is a distinction that all mankind make, and therefore I cannot doubt of its being a natural distinction; and certainly an obvious natural distinction is to be preferred to one more obscure. As to my part, if two plants, one a tree and the other an herb, should happen to agree in every part of the fructification, yet I could not persuade myself to think them of the same kind; there is something so very different in the whole formation and constitution between a tree and an herb. I know it is objected that there is no certain criterion to distinguish them, that any criterion hitherto given by botanists will agree to some herbs: but this objection I do not think sufficient, for it may be only a proof of our want of knowledge in giving the proper criterion, not that the distinction is not real. If this objection should hold, it may go further, even to destroy all distinction between vegetables and animals; because I know no criterion to distinguish animals from vegetables but what leaves room to doubt to which of them some species belong: witness the polypus, which has been the subject of late observation. Indeed, my opinion is, that the natural gradation from the lowest class to the highest is by such small and imperceptible steps, that it is very difficult to distinguish even the next step, either upwards or downwards; though at some distance the distinction be very remarkable. *For this reason, any system in botany would give me a strong prejudice in its favor, where there appears such a*

* The *Comptonia asplenifolia* of Gærtner.—A. G.

gradation from one class to another, and from one genus to another, through the several species, that the step from one to the other becomes almost imperceptible. Whenever this system shall be discovered, I shall conclude it to be the natural system.

Give me leave to make another objection to the Doctor's system; for it is not with any view to depreciate so worthy and great a performance, but that I wish to have it as perfect as possible; and I hope he will live to make it such, as I know no man so capable of doing it. It is this, that the distinction of the *Syngenesia* class, according to the male, female, hermaphrodite, and neutral flowers is so very nice, and in many cases requires such a clear sight, and is apt to run the observers into confusion; which, by comparing the first and second editions of his characters, the Doctor himself has not been able to avoid in some instances. Add to this what I have before observed of the *Clematis*, *Sagittaria*, and *Myrica*, and we may have room to suspect that it does not truly and naturally distinguish the genera, but that the same species are subject to variations with respect to these. But it is time for me to stop. *Ne sutor ultra crepidam*. However, I must again mention what I before hinted to you of the *Gynandria Diandria*, that I still think that one distinguishing part of this natural class, among other parts of their character is, that the stamina or antheræ are affixed to the nectarium in some shape or other. This I have observed in all the species that I have had an opportunity to examine; which are indeed so very few that I can rely no more upon it than to recommend it to your examination; for I could not, after reading Linnæus's description of this kind of flower, discover any other stamina than what I take to be such. Since I wrote my former [letter], I examined the *Cypripedium*; there in the hollow of the nectarium, this down or fine hairs appear, and if I be not mistaken, the antheræ are affixed not on their summit or top, as usual, but to the sides of the filaments below their summits. Two stamina seem not sufficient to me to impregnate the great quantity of seed contained in the capsule. Nature every where else seems careful to make sure work, even by profusion. You, who have the advantage of botanical gardens, may soon be satisfied whether there be any real ground for my conjecture.

I have long wished to see Dr. Linnæus's *Philosophia Botanica*, that is, ever since I saw the name of it mentioned, and was a

little acquainted with his works. But when you wish in vain, it is needless for me to add my wishes. The reasons the Doctor gives you for suppressing that book, in my opinion, should not prevail with a good man in depriving mankind of a general benefit. * * *

The benefit of oil in the cure of the bite of the Rattlesnake has been confirmed in several instances in this country, and even that hog's lard is effectual; and of consequence it is probable that all oily things are. It has long been observed in this country, that hogs were never hurt by the bite of the Rattlesnake, or by any viper; though all our other cattle at some time or other have been. This I attribute to the natural defence they have by their fat, through which the teeth of the viper cannot penetrate, without giving the remedy at the same time. You know how dangerous it is to trust to experiments, unless they be performed with all requisite precaution; but I can assure you that I would rather trust to oil or hog's lard than to the famous *Polygala*, or Rattlesnake-root, or to any other medicine that I have heard of; because the beneficial use of this comes better confirmed to me than that of the Rattlesnake-root or any other. We chiefly trust to the warm external application.

As you seem to be pleased with my communicating the use of any plants discovered in this country, I shall tell you what I learned of the use of the *Hamamelis* from a minister of the Church of England who officiates among the Mohawk Indians. He saw an almost total blindness, occasioned by a blow, cured by receiving the warm steam of a decoction of the bark of this plant through a funnel upon the place. This was done by direction of a Mohawk Indian, after other means had for a considerable time proved ineffectual. * * * Dr. Linnæus is right in observing that I had mistaken the gemma of this shrub for the involucre, in the description I gave of it.*

I have not yet been able to see the fruit of no. 131, but I cannot doubt of its belonging to the class of the *Tetradynamia*, for

* Respecting Colden's description of this plant, Linnæus writes to Gronovius: "Quod vocat *Involucrum* est *Gemma*. * * Nectaria egregie describit, quæ videre nequivisti: fructus a te missus docet esse capsulam duram, nec nucem." Nevertheless, Colden's detailed character of the genus (*Plantæ Coldenhamiæ*, no. 18.) is not only perfectly correct, but is adopted by Linnæus in his *Genera Plantarum*, &c., where the character commences with "*Involucrum triphyllum, triflorum*," etc.—A. G.

besides its agreeing in all its parts of the flower with the characters of that class, it agrees likewise in taste, having nearly the same with that of the *Nasturtium*. The Mohawk Indians told me that when they were quite faint with travel and fasting, if they can come at the roots of this plant to eat, they are refreshed, and their spirits restored wonderfully. Add to the character I gave what follows: *Radix longa, teres, repens, prominentiis plurimis angulosis*.*

What I wrote to you of the species of the *Zea semine nudo*, I believe is entirely a mistake; for having some of these seeds, the plants which came from them produced seeds covered with a hard skin, as the other sorts are. I suspect some artifice was used to deceive me. Whatever Tournefort may say, I cannot doubt of these being distinct species of the Maize, notwithstanding that they cannot be distinguished either by the leaf or flower. But we that are well acquainted with the seed can distinguish the species, though it be very difficult to convey that distinction by words only to others. Sow the several species in the same soil and at the same time, they will come to ripeness at very different seasons in the year; and this property they never change, unless when sown together so that they bastardize.

This brings to my mind a thought which I have entertained, viz. that we have in America very few if any species of plants or animals entirely the same with those in Europe, except such as have been brought from thence: although some species are so nearly alike that it is difficult to describe the difference by words; though it be manifest to a curious observer.

If I, who understand so little of botany, were permitted to advise, I should propose the plants to be collected into their natural order or classes without regard to any system; after which I would make a system by which the same plants should be disposed according to the rules of that system, with the view only to assist learners or the ignorant to discover the proper name or place of each plant. And in this I would have no regard to the natural system, but even divide and separate the species of the same genus into different classes, if the rules of my system required it; for I would have this system to be looked on as nothing else but as an index to discover the plant one desires to find

* The plant is doubtless the *Dentaria diphylla*.—A. G.

in its proper place; and therefore I should prefer a system that serves best to this purpose, though it should no way agree with the natural system. By this means many disputes would be avoided among botanists, and the system would be more beneficial to learners: for thereby they would have a double method of discovering any unknown plant; first from its natural conformity to some other known plant, and secondly, from some remarkable part of its character by which they are in the artificial system led to it.* I cannot forbear to wish that you would try this method in a new edition of your American plants, for my sake, and other unskillful philo-botanists in America.

I shall be obliged to you, if you will please to inform me of any new valuable works in medicine published with you. I have not the good fortune to have seen any thing in the *materia medica* that entirely pleases me.

You cannot expect much new in literature from this part of the world. I send with this a curious and new invention for warming a room with a small fire more effectually than can be done by a large fire in the common method, and is free of the inconveniencies which attend the Dutch and German stoves; because by this contrivance there is a continual supply of fresh warm air.† It may be particularly useful to you and Dr. Linnæus, by preserving your health while it keeps you warm at your studies. It is the invention of Mr. Benjamin Franklin, of Philadelphia, the printer of it, a very ingenious man. Experience confirms the benefit of it. * * *

I design to give our friend, Mr. Collinson of London, the trouble of conveying this to you; because we have not any ship at this time designed from this to Holland. He does me commonly the pleasure of writing to me twice in the year, at the seasons our ships commonly leave London, viz. in the end of February and beginning of September. When any ships from Amsterdam either go to New York or to Philadelphia, if your friends at Amsterdam please to direct your letters for me by the New York ships, to the care of Mr. Richard Nicholls, Postmaster in New

* This proposal to employ a natural system of classification, with an artificial analysis to facilitate its application, appears to correspond entirely with the methods now in use.—A. G.

† The pamphlet here referred to (printed in 1774) is reproduced in *Sparks, Works of Franklin*, Vol. 6.—A. G.

York, or by the Philadelphia ships to the care of Mr. Benjamin Franklin, Postmaster in Philadelphia, they will come safe to my hands.

DR. COLDEN TO GRONOVIVS.

Coldenham, in New York, Oct. 29th, 1745.

DEAR SIR—I answered yours of the 3d of April, 1744, near twelve months gone, directed to the care of our common friend Mr. Collinson of London; which he tells me he has carefully transmitted to you. This is destined to be sent likewise to his care, since he is pleased with having this trouble put upon him. I am so little acquainted with the merchants in this place who trade directly to Holland, that the ships are commonly gone before I hear any thing of them. Besides, most of these merchants and masters of vessels are very careless of any thing of which they have no prospect of any profit.

With this, I send you the characters of some more plants, which I observed this year, and some corrections or additions to what I before observed, some dried specimens, and some seeds. I have presumed, with that freedom which is I think allowed in all philosophical inquiries, to mention some further difficulties which arise to me in the Linnæan system; and though you may perhaps easily solve them by showing my ignorance in botany as a science, yet, as probably the same difficulties may occur to others, it may be of some use, by giving you an opportunity of clearing up this matter, to others less versant in that science. ***

My opinion that we have no species of plants in America precisely the same with those of Europe, requires much more knowledge of the plants than I can pretend to in support of it. But at the same time it will be difficult to demonstrate that it is false; for certainly some species differ, in which it is difficult to show the difference in words. For a carpenter can know a chip of one kind of timber from another, and can distinguish a piece of American oak from the English. We, who are used to the woods, can distinguish the trees and their several species by the bark alone; and yet I believe the most able botanist would be puzzled to describe either the grain of the several kinds of timber, or the differences of the superficies of the bark, so as to enable a stranger to distinguish them without further assistance. As to animals, I have never seen any precisely the same.

I must still insist upon it that there are several species of maize, though there be no difference in the shape and proportion of the several parts; but there is a great difference in the bulk and stature of the several species, and of their time of coming to maturity, though planted in the same soil and at the same time. Neither can I conceive that there can be any variations of the same genus where there are not different species: because I think that the variations arise from the farina of one species impregnating another species. * * * * We are well assured that all the Indian nations as far north as New England, planted maize when the English and Dutch first discovered them; and it is for this reason that it has obtained the name of Indian corn among the English. The Indians towards the sea on the New England coast, planted a small yellow sort, early ripe; those in the northern parts of New York, a small white sort, likewise; the Indians in the southern parts of New York, in Jersey and Pennsylvania, a larger sort, of variety of colors, and ripe a month later than the former sorts; and in Virginia and South Carolina they planted maize which rises to a great height, but is late in coming to maturity. In the several parts of the country where only one species is planted, no variations are observed. Now, sir, I think it not probable that all these far distant nations should so soon have received maize from the Spaniards, and to have adapted the several species of it to their several climates; and from the Spaniards only could they have obtained it, if it was not a native of their own country. But I even doubt if maize was common in Spain before the discovery in America. Besides, we observe that the Indians very slowly receive any of our customs; notwithstanding that the English and Dutch have lived so long with them, no Indian nation has hitherto sowed wheat or any other of our grains. For these reasons, I conclude that maize is a native of America, and that we have different species of it from those of Asia. My negroes tell me that they have kinds of maize in Africa very different from any in this country; and I am lately told that the Turkey maize is a different species from any we have.

I have, in considering Dr. Linnæus's characters of plants, endeavored to form some criterion for myself, whereby to know, when any new plant offers itself, whether it be of a distinct genus of its own, or a species of some other genus already known;

and to judge which of the botanists have pursued the method most conforming to the natural in their system; for I find that they all sometimes differ widely in this respect. For example, Linnæus ranks under the genus of *Convallaria* and under *Lonicera*, plants which all other botanists referred to several different genera: indeed, I think the parts of fructification in many of them may be sufficiently distinguished. On the other hand, it is very difficult for me to distinguish the genera of many of the class of *Hexandria* which he makes distinct. Since there is no manner of concord as to this grand point in botany among the ablest botanists, I may be allowed to suspect that no sufficient criterion has yet been discovered.*

I must therefore conclude, that however unsystematical and artless Mr. Ray's taking in the *tota facies* of plants into his distinction of the genera may be thought, we cannot entirely throw it aside, till some better criterion be found than has hitherto been given by botanists. For, so far as I can judge from the characters of plants given by others, and what little observation I have made, the parts of fructification alone, that is, the outward shape and form, number of cells, &c. is not sufficient in every case to distinguish the genera. Neither are the general shape and form of the leaves, stalks, and roots, or their proportion to each other, sufficient to distinguish the species, but that sometimes some other circumstances are to be considered, as particularly that of the time in which they acquire maturity.

But notwithstanding these objections I make to Dr. Linnæus's system, they no way lessen the esteem and value I have for his works; for I am more obliged to him than to any botanist I have seen. It is wonderful with what exactness he has observed such a vast variety of plants; and it is as wonderful to me that he has made so few mistakes in this great performance. What objections I make to his system will almost equally affect all systems. We have not as yet sufficient knowledge to adapt our systems

* Dr. Colden then proposes the faculty of hybridization as a test of this point, and considers those species which hybridize as belonging to the same genus, and those that cannot be made to hybridize to belong to different genera, and proceeds to defend this view by various illustrations drawn both from the vegetable and animal kingdoms. In his subsequent letter to Linnæus, (published in full by Smith in his *Correspondence*, l. c. Vol. II, p. 452,) he considers the same subject in a similar manner. It is hardly necessary to state, that he seems to confound proper varieties with hybrids.—A. G.

to nature ; and therefore every systematic writer in every science would have forced nature to comply with his system, where he found that he could not bring his system to nature. From what I have now wrote, *you will see the reason I have to prefer the method of reducing the plants into certain orders (Ordines) rather than to a general system* : because I believe that by this method we will not so easily fall into mistakes of dividing or confounding what should be joined or separated, as we are tempted to do for the sake of a favorite system.

DR. COLDEN TO GRONOVIVS.

Province of New York, Coldenham, May 30th, 1746.

SIR—The enclosed sheets are a copy of what I sent to you in the beginning of last winter, directed to the care of Mr. Collinson : but as we have heard that the ship was taken betwixt Portsmouth and the Dains, and carried into Dieppe, these papers must be lost. As such misfortune was to be expected, there was an outside direction on the packet in French, desiring the captors in such case to send them to the gentlemen of the Royal Garden at Paris ; though I then thought, and still think, that such creatures as privateers commonly are, will very little mind any thing of the kind. But I mention this to you, in case the privateer be a man of some taste for learning, you may take some opportunity of inquiring after them. I sent along with the papers the specimens which you desired, and some others, together with the seeds of several plants ; the loss of them I cannot at present repair. Pray God these wars may soon cease, for they are very destructive to learning. [He next announces the reception of a letter from Gronovius, dated July 9th, 1745, as well as the missing packet, despatched in 1743, and mentioned in Gronovius's letter of that year. This third letter of Gronovius, unfortunately, is not to be found among the Colden papers. At the close of this short epistle, Dr. Colden alludes as follows to the philosophical speculations which about this time occupied much of his attention.]

I design to order three copies of a small piece to be put up in this parcel, which I intend to submit to the examination of the learned, the printing of which I hope will be finished before this goes. It is on a subject which has puzzled philosophers in all ages ; the solution of which I fancy that I have hit upon, and

that it may be of use in the improvement of knowledge in every part of physics. I know not whether your taste be in this [department ?] of learning ; but whether or not, I must beg the favor of you to desire some of your mathematicians, those chiefly versant in the Newtonian and Leibnitzian systems to peruse it, (of which no doubt you have some of distinguished character in your university,) and that you will favor me with your own and their opinion of it, as soon as your conveniency permits. I earnestly beg you to do it without compliment, and with the sincerity and freedom of a friend and philosopher, as you see I endeavor to write to you.

This country is now engaged in a most barbarous war with Indians, popish converts, set on by accursed priests to murder innocent people in their beds, or at their daily labor. Good God, what a religion must that be that incites men to such cruelties ! And yet, from what we learn from the public news, your country seems not sufficiently apprehensive of being again subjects of such a bloody and cruel tyranny.

The *piece* referred to in the foregoing letter was doubtless his "*Explication of the first causes of action in matter, and of the cause of Gravitation ;*" which was first privately printed in New York, and afterwards (in 1746) reprinted in London without the author's knowledge. An enlarged edition, with the author's corrections, was published in London in 1751, with the title, "*The principles of action in matter, the Gravitation of bodies, and the motion of the planets explained from those principles.*" An extract from the preface of this treatise, exhibiting an outline of Mr. Colden's views, to which he attached high importance, is given in *Sparks, Works of Franklin*, Vol. 6, p. 96.

DR. COLDEN TO GRONOVIVS.

New York, Oct. 1st, 1755.

To Dr. John Frederic Gronovius, Senateur de la ville de Leiden.

It is so long since I had the favor of a line from you, that I have frequently lamented the loss I sustain by being deprived of that correspondence with which you once honored me. Soon after my last to you, my time was so entirely taken up in the public affairs while the last war continued with France, that I

could in no shape continue my botanical amusements. My advanced age, now in the sixty-eighth year of my life, made me think it high time to retire from business, and to indulge the remainder of life in more agreeable pursuits, which require less action than those I formerly engaged in, of which I am become incapable. I am now entirely wrapped up in philosophical amusements, of which perhaps you may see some fruit, if what I have done receive the approbation of those gentlemen to whose judgment it is submitted. * * * But you will perceive by what is inclosed, that botany is not entirely out of my thoughts.

I thought that botany is an amusement which may be made agreeable to the ladies, who are often at a loss to fill up their time. Their natural curiosity, and the pleasure they take in the beauty and variety of dress, seems to fit them for it. The chief reason that few or none of them have hitherto applied themselves to this study, I believe, is because all the books of any value are wrote in Latin, and so filled with technical words, that the obtaining the necessary previous knowledge is so tiresome and disagreeable, that they are discouraged at the first setting out, and give it over before they can receive any pleasure in the pursuit.

I have a daughter who has an inclination to reading, and a curiosity for natural philosophy or natural history, and a sufficient capacity for attaining a competent knowledge. I took the pains to explain Linnæus's system, and to put it in an English form for her use, by freeing it from the technical terms, which was easily done by using two or three words in place of one. She is now grown very fond of the study, and has made such a progress in it as I believe would please you, if you saw her performance. Though perhaps she could not have been persuaded to learn the terms at first, she now understands in some degree Linnæus's characters, notwithstanding that she does not understand Latin. She has already a pretty large volume in writing, of the description of plants. She was shown a method of taking the impression of the leaves on paper with printer's ink, by a simple kind of rolling press, which is of use in distinguishing the species. No description in words alone can give so clear an idea, as when assisted with a picture. She has the impression of three hundred plants in the manner you'll see by the samples. That you may have some conception of her per-

formance and her manner of describing, I propose to inclose some samples in her own writing, some of which I think are new genus's. One is the *Panax foliis ternis ternatis*, in the *Flora Virg.* * * Two more I have not found described any where; and in the others you'll find some things particular, which I think are not taken notice of by any author I have seen. If you think, sir, that she can be of any use to you, she will be extremely pleased at being employed by you, either in sending descriptions, or any seeds you shall desire, or dried specimens of any particular plant you shall mention to me. She has time to apply herself to gratify your curiosity more than I ever had; and now when I have time, the infirmities of age disable me.*

Nothing could oblige me more than your having introduced me to some correspondence with Dr. Linnæus, from whom I have had the honor of some letters. With the last I received the first part of the *Plantæ Coldenhamiæ*, &c., which he has published in a manner very much to my advantage; but I have not seen the second part, which by a line at the end of the first is promised.† I am very unfortunate in not being able to continue any correspondence with him, by the want of every method of conveyance between us. I have attempted it unsuccessfully by way of London, I suspect by my friend —'s neglect. However, sir, pray when you have an opportunity, make my compliments to Dr. Linnæus, and assure him that no man can have a higher esteem of his great merit than I have, or would more willingly, were it in my power, make a grateful return for the favors I have received. Please to let me know what new things he has done for the information of the world. No doubt he still continues to improve our knowledge, but I am entirely ignorant of every thing lately done by him.

I had the pleasure of conversing with Mr. Kalm, in his passing and repassing through this province; though I was at the time

* Further information respecting Miss Jane Colden, the first botanist of her sex in this country, may be found in the correspondence of Collinson, Garden, and Ellis, with Linnæus, (noticed also in this Journal, Vol. xI., pp. 5-6.) In the second volume of the *Edinburgh Essays and Observations, physical and literary*, 1780, she has very correctly described under the name of *Gardenia*, the *Hypericum Virginicum* of Linnæus, (*Elodea*, Adans.) and skillfully indicated the characters which generically distinguish it from *Hypericum*. Miss Colden died unmarried.—A. G.

† The second part of the *Plantæ Coldenhamiæ*, we believe was never published.—A. G.

very much encumbered in business. As he had the advantage of being thoroughly conversant in the European plants, more than any other person who before him had been in America, I was full of hopes that the American part of botany would be brought to great perfection, and have longed to see his performance in print. However, as many plants must have escaped his researches, much must be left to the industry of those who follow him; whose labor must be much facilitated by what no doubt he has done.

It is so long since I received a line from you, that I know not how you are disposed to receive any thing from me, or that you are now desirous of having some seeds which you mentioned formerly, otherwise they would have been sent at this time. I likewise heard that you was deeply engaged in business.

The two letters which Dr. Colden received from Kalm were written from Philadelphia; the first shortly after his arrival in this country; the second just before his return to Sweden. They are written in tolerable English.

KALM TO DR. COLDEN.

Philadelphia, September 29th, 1748.

DEAR SIR—I have the honor to send to you the letters of Mr. Linnæus, which he did leave to me the last year, when I went from Sweden. It is about three weeks since I first came to this country. When I first was going from my own country, I thought that I should have the good luck to be here in the beginning of the spring; but great storms in the sea, besides the war, did hinder me from the same. Now, because I do not know if I can have the leisure and advantage to see you, sir, I could not forbear to send you the above mentioned Mr. Linnæus's letter. I can't enough express the kind love and great esteem he have for you. I should too think myself very happy if I could have the honor to see you and pay you my respects; but I can't tell any thing yet, if I am to take the road from hence to New England by water or by land. I am sent of the Royal Academy in Stockholm, to make several observations in the Natural History of the most Northern parts of America, in Botany, Zoology, Astronomy, etc. I have the mind to stay

this next winter in Boston, or perhaps more to North ; and the next summer, if God keep me safe, I think to see some part of Canada. In the latter end of the same summer I propose to return to England, and so to my own country. If I did know that you have no exemplar of Mr. Linnæus' his *Fauna Suecica*, I could spare you one thereof. I have yet by me one exemplar of his *Flora Zeylanica* ; if I come to you, sir, you shall have the same too. I took some of his books with me to give to my friends and the lovers of Natural History in this country ; which, perhaps, not always can have the same. I have self had the advantage to be by Mr. Linnæus about two years time, and was loved of him as [if] I was his own child. If it happens that I am to take the way through New York, I will pay you my respect. Ignoscas quæso, vir nobilissime, si minus bene lingua vestra utar, notitia enim omni elegantissima et utilissima hujus lingua penitus carebam, priusquam Anglicus salutas scire terras. I am, dear sir, your most humble servant,

PETER KALM.

P. S. I should be very much obliged to you, sir, if you could procure for me some seeds of the kind of *Acer* which they call *Sugar-Maple*, and whereof the Indians in some places make a sort of sugar.

KALM TO DR. COLDEN.

Philadelphia, January 4th, 1759.

DEAR SIR—Upon my last letter, which I had the honor to write to you, sir, I have not to this day received any answer ; so that I am very uneasy, fearing you is not well. I had the honor then to acquaint you, that I had deferred my going home to the month of January, because I was not sure to find any ships going for Sweden at my arrival in London. Now as the ship upon which I intend to go from hence will not be ready to sail before in the middle of February next, I have taken the opportunity to write to you with another gentleman. I should be very glad, sir, if I could receive from you the letter to Mr. Linnæus, which you was so kind and promised to send to him : he will be exceedingly glad of that, as there are few persons he sets such a value upon as upon you.

But excuse me, dear sir, that I again am so bold to trouble you with the same that I before wrote to you.

1. Be pleased to give me a good history of your life; there is nothing we want so much as a *Biographia Botanicorum*: the old were very negligent in that. There are many of which we hardly know any thing but the name; nay, if we shall get to the history of their life, we are obliged to pick up here and there a word in the writings of their contemporaries. At our days we take a more trouble in that. I have already got the history of Mr. Bartram's life, and of Clayton's. I hope Dr. Gronovius will give out his *vitæ historiam*.

2. If it was not too much trouble to give me a catalogue of all the Quadrupeds you have any knowledge of to be here in North America, both wild and tame. My catalogue of them is this; of wild, Panther, Wild cat, Loup, . . . Martin, Skunk, Mink, Fischer, Possum, Otter, Seal, Wolf, Red fox, Gray fox, Fox with a cross upon the back, Silver-colored fox, Black fox, White fox, Bear, White bear, Raccoon, Ground-hog, Porcupine, Talpa, Vespertilio, Rabbit, Hare; of Squirrel-kind, the Gray, Red, Black, Flying, Ground, White; Beaver, Musk-rat, Deer, Elk [Elk], Wild oxen of two sorts.

Is there more than one sort of Panther?

Is there more than one sort of Wild-cat? The French in Canada made a distinction between *Chat sauvage* and *Loup* . . .

Is there any *Mustela vulgaris* or Weasel, colore albo, vel alio colore?

Is there any Opossum so far to north as where you lives?

Are the Seals seen in Hudson's River?

Is there more than one sort of Wolves?

Is there any white Bears different from that at Hudson's Bay?

Is it more than one sort of Porcupine?

Is it more than one sort of Bat, or Vespertilio?

How many sorts of Rat-kind?

Is there more than one sort of Deer? The French make distinction between *Cerf* and *Chevreuil*.

Have you heard any thing of the Moose-deer?

Pray, sir, give me a short catalogue of all the fishes you know to be in fresh water in your province. What is your opinion why people lose their teeths so soon in this country?

Will you not wonder to hear that I have found here in America, growing wild, the *Colocassia*, or *Faba Egyptia veterum*; which is that species of *Nymphaea* which you will find in *Linnaei Flora Zeylanica*?

My respect to Mistress Colden, the Misses, and young Master Colden: I have the honor to be, dear sir, your most humble and obedient servant,

PETER KALM.

DR. COLDEN TO KALM.

SIR—I have the favor of yours of the 4th of last month; but that which you mention to have wrote preceding never came to my hands; so that, till I received your last, I did not know whether you had left America last fall, as you proposed, or not. This made me lately write to Mr. Franklin, to know the certainty of it. I heartily wish you a happy voyage home, and that at your return you may receive those rewards which your labors richly deserve. In answer to the questions you put to me, I shall inform you, as far as my knowledge allows me to go, and in such manner as I judge best suits the view of your queries.

As to what you desire to know of myself, though the account would come more properly from another, yet I shall briefly tell you the principal turns of my life. My father was a minister of the church of Scotland, and the oldest minister in it, before he died. He was much esteemed for his piety and strict morals, and had a considerable interest with many of the nobility. I was educated at the University of Edinburgh. My father's view in my education was for the church, as by his interest I could have no doubt of preferment in it. But after I had gone through the usual studies at the University, my inclinations were averse to entering into orders in the church, and I applied myself to the study of physic. I learned the rudiments of botany under Dr. Preston, whose name you'll find in *Ray's Methodus*. I went through a course of anatomy with Dr. Ariskine [Erskine?], and of chemistry with Mr. Wilson; both of them distinguished in their professions at London. The salaries of the ministers in the church of Scotland are very small; and the expense of my education had so far exhausted my father's pocket, that I found it was not in my power to make which it is necessary for a young physician to do in Great Britain, on his first appearing in the world. My mother had a sister in Philadelphia, a widow who had acquired some estate and had no children, and this induced me to try my fortune in America. I arrived at Philadelphia in the year 1710. Upon my arrival I became very in-

quisitive into the American plants; but they were then so little known, and I had so little assistance from my books, that I was soon discouraged. In the year 1715, I returned to Great Britain. I had conversation with Dr. Halley, and other men of learning at London in the mathematics, for my taste chiefly inclined me to that study. I went to Scotland, and married my present wife, and the year following returned to Philadelphia. I fixed [myself] there, with a view to practice physic; but in the year 1718, I had the curiosity to visit New York, without the least thought of changing my place of residence. I visited the then Governor of the place, General Hunter, as it is usual for strangers to do, though I had no manner of acquaintance with him. He received me more kindly than I expected, and though I staid but three days in the place, I was invited by him to particular conversations. General Hunter had served in the army from the time of the Revolution in Great Britain, under King William and the Duke of Marlborough, to the year 1709, when he was made Governor of New York. He had not only distinguished himself in the field, but likewise in the court, among the polite and men of learning. In about a fortnight's time after I had returned to Philadelphia, I very unexpectedly received a letter from Gov. Hunter, with an invitation to come to New York with my family, accompanied with the offer of an office of profit; which I accepted, and soon after removed to New York. Gov. Hunter continued in his government only two years after my removal; but I had the good fortune to be in favor with all his successors, one only excepted. In the year 1722, I was appointed one of the King's Council for the province of New York. The business of my office of Surveyor General of lands obliged me to be much in the country, and my intimacy with the governors occasioning a greater expense than suited my circumstances and tastes, accompanied with no small share of envy, I removed my family, about the year 1739, to the country. After which time I indulged my humor in philosophical amusements more than I could do while in town. It was some years after this, that I accidentally met with Dr. Linnæus's *Genera Plantarum*. I was so much taken with the accuracy of his characters, that I resolved to examine them with the plants that grow near my house; and this is the sole occasion of what you have seen

1729.

from me in Botany, and which is so inconsiderable that I can have no pretensions to any merit in the science.*

As to your other queries I can give you but little satisfaction. You know a great deal more than I do of the quadrupeds in America. I never heard, nor did I imagine that we had so many species of Foxes in America as you mention. It is very unhappy that our climate is so fitted to the fox constitution. I know of neither Hare nor Rabbit in this country; what we have is a middle species between the two. I have heard of a white Squirrel. Panthers are so rare that we hear of one only in a dozen years. I have seen two species of the *Mustela*; one, *Mustela fulvo-nigricans inferiore parte capitis, gulæ, abdominis, et interiori femorum alba*; 2. *Mustela tota candidissima excepto cauda apice atro*. This last is the only beast of the ravenous kind that I have a value for; because one or two of them delivered my house and barn from rats, when I was like to be devoured by them. * * * It is a most beautiful white and soft fur, so that I do not doubt of its being the true ermine.

I never saw an Opossum, nor heard of any in this province. I never heard of more than one kind of Wolf, and I suppose that you know the Indian Dog is much shaped like a Wolf. I never saw any Porcupine but in the Mohawks country, nor have I ever heard of any in this part of the country. I know only one sort of Rat; none of the Rat-kind I believe are properly natives of America, but have been all originally imported. I have often heard of the Moose-deer. One, I think, since I came to the country was caught near Albany, but I can give you no description of it. I have heard that it is as large as an ox, and has a mane like a horse. Any country boy you meet with can inform you more of fishes than I can.

As to the reason of the children of the people from Europe (not the native Indians) losing their teeth so commonly, I attribute it entirely to the scurvy, of which scarce one family is free. * * * I have heard that the Indians eat the roots of one kind of *Nymphæa*; but I did not suspect it to be the *Colocassia*, because Linnæus ranks that with the *Arum*. Please to distinguish the species, and tell me the reason you think it the *Colocassia*

* The reader will find another brief autobiography of Dr. Colden, in his letter to Peter Collinson, dated May, 1742.—A. G.

Ægyptiacum. It will give me the greatest pleasure to hear of your safe arrival at home, and that you have published the fruits of your labors in America. Mr. Franklin, at Philadelphia, will take care of any letters for me, or Mr. Collinson in London.

The Colden papers comprise three letters from Linnæus. The earliest is dated at Upsal, on the 6th of August, 1747, and was sent by a clergyman by the name of Sandin, who came to Pennsylvania. It contains a few remarks upon the manuscript *Plantæ Coldenhamiæ*, then in his possession, and a request that he would send dried plants and seeds. The second, without particular date, was written in the same year, and brought by Kalm, and contains many notes and queries respecting the plants of Colden's manuscript. To these, Dr. Colden replied at length in his letter of February 9th, 1748-9 (O. S.), and in another entrusted to Kalm a year after; which having both been published in full by Smith, in his *Correspondence of Linnæus*, need not be reproduced here. The first is chiefly occupied with Colden's views respecting the nature of genera, &c., which are substantially the same with those given in his letters to Gronovius. Linnæus briefly alludes to this subject in the following epistle.

VIRO ILLUSTRİ CONVALLAD. COLDEN s. pl. d. CAR. LINNÆUS.

Literas tuas vir illustris, 1748-9, Febr. 9 datas, accepi, et summa animi voluptate perlegi, utpote datas a Fautore longe remoto et curiosissimo. Sententiam quam fores de generatione plantarum ad instructionem generum, eadem est quam proposuit D. Mitchel in Actis Naturæ Curiosorum; statuis plantas ejusdem generis esse, quæ possunt genitura sese miscere; at ego has varietates dico, nec distincta genera. Sint exempli gratia Ranunculi species diversæ, quas nullus negabit genere convenire, attamen hæ nulla ratione possunt sese miscere aut una alteram fæcundare; sed Tulipæ [quædam] et Brassicæ, quæ tantum sunt varietates, miscentur facillime.

Dubia et obscura in re herbaria circa terminos et leges varias systematis explicavi in *Philosophia Botanica*, quæ etiamnum sudat, quam cum etiamnum e prelo non prodiit, doleo me hac vice ad te, vir illustris, mittere non posse. Habebis in eo libello omnia dubia enodata, quam primum prodeat.

Mitto *Acta Upsaliensia* pro anno 1743, ut videas primam partem *Descriptionum* Tuarum: altera pars imprimitur in anno 1744, quæ nondum a prelo exiit. Si habes plura mittas quæso, omnia candide actis inseram; utinam velles tum aliquot plantas siccas simul mittere et semina: occasio quotannis datur per theologos nostrates. Si quidquam sit quod in nostris terris desideras, parata tibi sunt omnia quæ a me expetas.

Multæ sunt inter tuas plantas rarissimæ, antea non descriptæ, nobis nec vivæ, nec siccæ visæ; utinam liceret has possidere in herbario nostro. Tu valeas et diu vivas. Has exorare debui ut testarem officia et observantiam meam Mecænatem in Floræ.

Dabam Upsaliæ, 1750, d. 10 Augusti.

Dr. Colden's correspondence with Peter Collinson commenced in the year 1740, and was continued without interruption during the life of that amiable and excellent man. Collinson's last letter is dated July 2d, 1768: he died on the 11th of August following, in the 75th year of his age. The selections I have ventured to make from this voluminous correspondence, form an appropriate supplement to Smith's very interesting collection of the letters of Collinson to Linnæus.

MR. COLLINSON TO DR. COLDEN.

London, March 7th, 1741.

DEAR FRIEND—You have much obliged me by yours of the 22d June, and I am glad to find my little offices were acceptable to you.

I communicated your letter and project* to Mr. Grayham, whose answer I enclose; he has also been so good as to get Mr. Sisson's proposal to make an instrument that will be suitable for your purpose.

I also lent Mr. Grayham your *History of the five Indian Nations*: he was mightily pleased with it, and hoped you would oblige the world with the second part; for that he had not read any that had gave him that satisfaction and information that yours did, because he was persuaded he could depend on your veracity. You really delight me in hopes of seeing the second part; but pray take your time and do it at your leisure.

* Relative to an improvement in the quadrant, which Dr. Colden had suggested.—A. G.

Pray have you thought, or can you give a conjecture how America was peopled, or was it a separate creation? Most of your vegetables and many of your animals are different from ours, and yet you have some exactly like ours, of which I have specimens by me; for I have a large collection, considering my years and station, of natural varieties, and some artificial, from most parts of the world, which I am obliged to my distant curious friends for sending me. They afford me great entertainment at my leisure hours; and in the country, if I may boast, my garden can show more of your vegetables than perhaps any in this island, which I have been collecting some years from seeds, and growing plants sent me by my friends in your world; so that I am no stranger to America, being pretty well acquainted with most of its productions, whether animal, vegetable, mineral or fossil, perhaps beyond what you can imagine. The uses I make of them is to admire them for the sake of the great and all-wise Creator of them, to enlarge my ideas of his almighty power and goodness to mankind, in making so many things for his profit and his pleasure. I reason on their natures and properties, so far as I am or can be informed; I compare them with ours; in short, I esteem the regard I pay them as a piece of adoration due to their great Author.

Thus, my dear friend, you see I open all my mind to you, and tell you how I employ all my leisure hours, I may say minutes, from business. I hate to be idle, and think all time sadly lost that is not usefully employed; for which reason, clubs, taverns, and coffee-houses, scarcely know me. Home is the most delightful place to me, where I divide my hours in business, in innocent amusements, and in the dear society of a tender, kind, good woman, a boy and a girl. I may now say with Milton, I have now brought you to the state of earthly bliss, and sincerely wish all mankind as happy.

I had a letter from J. Bartram;* he much laments the disappointment of not seeing you. I am persuaded you would have

* In a former letter, Mr. Collinson thus introduces the earliest native American botanist to Mr. Colden's notice.

"If an ingenious man, and a great searcher into nature, named John Bartram of Pennsylvania, should wait on you, please to give him what information you can in those things. He has been a considerable traveller in the world, and is employed by a set of noblemen and others to collect seeds and curiosities for

been pleased with him; you would have found a wonderful natural genius, considering his education, and that he was never out of America, but is an husbandman, and lives on a little estate of his own about five or six miles from Philadelphia, on the river Schuylkill. He really surprised me with a beautiful draught on a sheet of paper of the falls of Mohawk River, which he took when he was there, with a particular account of it, and also a map of his own making of Hudson River, Delaware, and Schuylkill, and the bay, which takes in the provinces of New York, Jerseys, Pennsylvania, Maryland, and part of Virginia; for he has travelled all over these countries yet uninhabited beyond the mountains, as well as the inhabited parts along the bay and the sea-shore, from the Capes to your province. His observations and accounts of all natural productions that happen in his way, (and I believe few escape him,) are much esteemed here for their truth; and he wants not terms to express himself with some accuracy. I have procured him assistance from some curious persons here, to enable him to make further discoveries. Now, my dear friend, I rely on your candor to receive this rambling epistle, as it is intended, in friendly part. From a man much engaged in business correctness is not to be expected; for really I am obliged to write a paragraph now and then, subject to many interruptions.

My best wishes attend you: when leisure offers give a line to
your sincere friend,

P. COLLINSON.

MR. COLLINSON TO DR. COLDEN.

London, March 12th, 1742.

MY DEAR FRIEND—You have loaded me with many favors. How I shall make ample returns I know not: but if you will allow me time and have patience, I may in some measure testify my gratitude. If I may judge of your disposition, I persuade myself you will prove a merciful creditor, and then by little and little I may discharge my obligations. But at this season is our greatest hurry of business, [so] that I am afraid I shall only be

them." The next year Mr. Collinson writes—"I have a letter from J. Bartram, who is full of gratitude for the kind reception at Coldenham. Your affable and generous treatment he will never forget; and indeed I have a due sense of the favors shown him, being partly on my recommendation."

able to acknowledge the favor of yours of May 5th, with your printing and botanic schemes inclosed.

You will expect I should give you some account of your curious manuscript. I cannot do this to my liking. Our people are so wretched mercenary, that they are unworthy of it. It is now in the hands of an honest, ingenious printer, (if I am not mistaken,) and in my next you will hear more from me. I am persuaded it will meet with approbation from the public; but the way to introduce it is through such wretched, narrow spirited creatures, who are wholly governed by interest, that it is really discouraging for an ingenious man to set pen to paper, if the common good did not counterbalance all other considerations.

I shall at my leisure consider your botanic essays. As to your printing scheme, a printer that is esteemed a knowing man and of great business, gives this answer to it, for it is out of my province. He says your scheme has been tried long ago by good hands, but was found to be expensive and inconvenient in many respects, and at no rate will do for any thing else but bibles, prayer-books, &c., and even in them it is very difficult; for alterations are not easily made, though the author of the scheme thinks otherwise. And as to authors, it would be a discouragement to them; for this method would at least cost them as much as printing a thousand copies in the common way. For the composing is the chief part of the expense, the press-work only coming to a trifle. It would be easy to convince any person of the impracticability of the thing, and the vast expense that would attend it, by a few minutes' conversation.

Now, my dear friend, I confide in your humane and candid disposition to excuse me from adding further, but that I am your obliged and affectionate friend,

P. COLLINSON.

Extract from a draft of a letter from Dr. Colden to Mr. Collinson (without date) in reply to the above.

"It seems that I have the misfortune to trouble you with discoveries which I thought my own, which have been tried by others before. This is owing to my knowing so little of what passes in the world. I must own, however, that a few years since I read in one of the London newspapers that a new method of printing was discovered, which it was thought would be of use in the advancement of learning, and a particular benefit to

authors: but of the manner not the least hint was given. This led me to think what possibly this method might be; on which occasion the scheme which I sent you occurred to my fancy. And as my own appeared to be feasible, and I heard nothing further of that mentioned in the newspaper, I concluded they might be different, and mine of use, though others should have failed. Mr. Graham's arguments fully convinced me that the improvements I proposed for a quadrant cannot answer my expectations; but I cannot say I am as much convinced that the method of printing cannot succeed, from the objection the printer has made to it. For the charge of composing and of the paper being the chief charge in printing, when once composing may serve for an age or longer, and for a hundred editions, it seems to me a strong argument in favor of the new method, rather than an objection to it. But perhaps the prejudice one has in favor of his own conceits, and a jealousy that printers may oppose it with a view to their own interest, may make me a less proper judge in this case. My situation in this country puts it out of my power to make any experiment of this method of printing; otherwise, could I have procured as many types of the fashion and metal which I propose, I should have put the matter out of dispute before I had sent my thoughts of it so far as England. But as the first author of it is in England, and has all the opportunities he can desire to recommend it, it is needless for me to think further of it. Only if you be acquainted with him, you may inform him that if the charge of lead plates be thought too great, that I think the impression from the types may be made on thin boards of lime-tree or poplar; both which are of a smooth grain, very soft while green, and hard when dry: and of any other thoughts I have had on the subject, I shall be well pleased that he make what use of them he thinks proper."

A particular account of Dr. Colden's invention, which resembles the early attempts at stereotype printing, is given in a letter to Dr. Franklin, dated October, 1743, which is published in the *American Medical and Philosophical Register*, (edited by Dr. Hosack and Dr. Francis,) and also in *Sparks, Works of Franklin*, Vol. 6, p. 18. The latter also gives the correspondence with Mr. Strahan (the printer to whom Mr. Collinson submitted the plan) upon this subject.

DR. COLDEN TO MR. COLLINSON.

May, 1742.

DEAR SIR—I never received any thing with more pleasure than yours of the 7th of March last ; when I perceived by it that I had gained so great a share of your friendship, and that by such means as I had reason to fear might have deterred you from continuing any further correspondence by the trouble it has given you ; and on a subject which proves fruitless, any otherwise than to show how careful a man should be not to be fond of any notions he conceives, or any subject which he does not perfectly understand, and how necessary and useful it is to consult those who are skillful. Mr. Graham in three lines, (master-like in mechanics,) not only shows that my notions cannot be reduced to practice, which I only before suspected, but that they are likewise faulty in theory in that respect. Pray, sir, return my most humble thanks to him. I can have no hopes of making him any return ; otherwise I should with a great deal of cheerfulness offer my service to him in this country. However, I still so far continue my opinion of the difficulties of making small instruments, especially if they be in any manner compounded, and likewise of the difficulty to observe with them to a sufficient accuracy, that I cannot as yet entertain a sufficient esteem of Mr. Sisson's instrument, because of the difficulty of discovering the errors and correcting them, when an entire circle is not used, otherwise than by a long series of observations made with the greatest accuracy.

Last winter I employed the greatest part of my leisure time in revising the first part of my *History of the Five Nations*, and in putting into some order the materials which I had collected about the year 1725 for the continuing of it ; and I left so much of it as I could then get copied with Mr. Alexander, in March last, to be sent to you by a ship which proposed to sail for London soon after that time ; and since that, I have got the remaining part of it copied, which I now send to him to be forwarded to you. I am truly ashamed that I could not have it copied in a better hand, but in the situation I am in I could not help it. My chief view in that work, I may truly say, is to do you a pleasure. However, if you think it may be useful to the public, you have my full consent to publish it in what manner you think fit ; though I have no great fondness to appear as an author, while I am sensible

how much more a man is likely to suffer from the malevolent tempers of many readers, than to gain any applause or benefit from those that are more candid and indulgent, where the design of writing appears to be useful, though it be weakly performed. Every man in my opinion owes so much to his country, that he should patiently submit to scoffs, and jests, and revilings, when he thinks he cannot avoid them by being useful ; and I hope it will appear my design is, as it really was, in writing that history, to be in some degree useful to my country. If it be so, I shall truly gain my end, without any further view besides that of endeavoring to give some pleasure and amusement to you.

I once had entertained hopes of enlarging my knowledge of the Indian affairs and manners, by spending some time among them ; but as I did not understand their language, and could have no interpreter but at a considerable expense, more than I could bear, I was forced to lay aside that design ; and now I have little or no hopes of gaining more information than what I already have. I might have put in several more particulars, to show upon what grounds I have more than once blamed the mismanagement of the Indian affairs in this province ; but I did not think it proper to be too particular, as it must throw severe reflections upon particular persons or families now in this province. I may venture to give you in private some particular facts which it is not proper by any means to be made public and general. * * * More such instances can be given. * * *

I look upon it, sir, as one of the happy incidents of my life, that I have had the good fortune to fall into a correspondence with you ; because I take you to be one much of my own taste, and I have often wished to communicate some thoughts in natural philosophy, which have remained many years with me undigested ; for we scarcely have a man in this country that takes any pleasure in such kind of speculations. Your communicating to me your private manner of life is the strongest instance of your friendship, and in some measure makes up the loss of a personal acquaintance, which I cannot hope to obtain. This encourages me to give you some account of myself, believing you may expect it, as I hope that you intend to continue your correspondence.

I was educated in Scotland, by my parents, with a view to be settled in the church there ; and I had as great encourage-

ment in that way by my father's interest, who was a minister of that church, as any young man could have; for my father was acquainted with, and had gained the esteem of many of the nobility and gentry, not only of those who thought as he did in respect to religious principle, but likewise of those who differed widely from him. But my taste and inclinations led my thoughts another way. I applied myself to the study of physic, and, as my father's fortune was not sufficient to enable me to push my fortune in England and Scotland, I went over to Pennsylvania, in the year 1710, where I had some relations. When I came first into America, I was very young,* and though I had some knowledge of books, I was absolutely a stranger to the world. The encouragement to a mere scholar is very small in any part of North America, and I had little sense of the value of money at that time, when it would not have been difficult for me by trade to have raised my fortune, as others did about the same time. I had sufficient for my present occasions, and I had not then learned to be concerned for the future.

In the year 1715 I married, and my family soon began to increase, which gave me some care that I had not before. Soon after this, going out of curiosity to see New York, I fell into Brigadier General Hunter's conversation, who was then governor of that place. He gave me an invitation to settle in New York, with an offer of his friendship, which I accepted. By his interest, I was made surveyor general of the king's lands in this province. Mr. Burnet soon succeeding him as the governor, I likewise gained his friendship, and he recommended me to be of the king's council for this province, in which two offices I have continued ever since. My family being considerably increased, I left the city at the time Mr. Burnet was removed from the government, and settled them in the country, where I now live, as being less expensive. I have been enabled to live above want, to keep free of debt, so as never to suffer a laboring man to go from my house without his wages, and I hope to be able to put my children in a way to provide for themselves by their own industry; which often proves more advantageous to them than leaving such estates as that they can hope to live without thought or care. My eldest son has for some years kept what we call a store in this part of the country. I suppose you know

* He was born, it appears, in the year 1688.—A. G.

of what kind of mercantile business it is, by your general knowledge of America. My eldest daughter is married, as to fortune beyond what I could expect in regard to my own, to one of the late Mr. De Lancy's sons. I doubt not you have heard of his father, he having been one of the most noted merchants in America. My younger children give me reasonable hopes of their doing well in the world, as they grow up, by their industry and virtue.

My removing to the country, I believe, has been of no disadvantage to my children, as it has freed them from many temptations to vice, to which youth is exposed in the city. My chief pleasure, like yours, is in my own family, with my wife and children, and I wish I could live so as never to be from them. I have always had a view to be useful to my country, (though I have had sometimes my designs that way grossly misinterpreted,) and I have taken most pleasure in speculation for that end. I cannot say how far I have succeeded; but none now deny the benefit of the trade at Oswego, in the framing of which scheme and reducing it to practice I had a considerable share. I have made a small spot of the world, which, when I first entered upon it, was the habitation only of wolves and bears and other wild animals, now no unfit habitation for a civilized family; so that I may without vanity take the comfort of not having been entirely useless in my generation. I once intended to have attempted the natural history of this province; and Mr. Burnet for my encouragement annexed a small salary to my office of surveyor general, to be paid out of his majesty's quit-rents. But Mr. H. Walpole at the same time having procured an additional salary as auditor of his majesty's revenue in America, mine was taken off, to make way for his, and I was left without any thing besides the perquisites of my office, which often are very precarious. This obliged me to lay aside all kind of study that was attended with expense of time and money. I hope, notwithstanding of this, to be able to entertain you from time to time with what may prove no disagreeable amusement, according to your own taste. I have at this time too far presumed on your patience; but it now begins to be difficult for me to leave off while I write to you; for I really am, dear sir, your most obliged and affectionately humble servant,

CADWALLADER COLDEN.

MR. COLLINSON TO DR. COLDEN.

London, March 9th, 1743.

DEAR MR. COLDEN—You cannot be more surprised at the progress of botany in Doct. Linnæus, than I am to see what a proficient you are on his scheme. I could not have imagined it had reached in so short a time to the remote parts of North America, for I hear he has made several proselytes in different places on your continent. But your fame reached me long before your letter. My valuable friend, Dr. Gronovius, let me know what a fine present you have made him; the good man is in raptures. I doubt not but Doct. Linnæus has heard of it long before this. I shall soon send your curious observations to Doct. Linnæus; your criticisms are perfectly just; you have done me a pleasure in circulating it through my hands, because it sets me right who have not leisure for such nice observations, and to the Doctor, I know it will give him the greatest delight; any omission in him is not owing to his judgment, but want of growing subjects whose minute parts are more distinct, which are lost in dried specimens; so that at the same time that you are improving your own knowledge, you are greatly obliging your friend; and if all his pupils was equally as communicative as you are, his works would be more perfect and complete. It is no little disadvantage to him to be settled as in the fag end of the world. In his letters to me, he envies our happiness, who have a free and frequent intercourse with your world, and our gardens abound with its productions; and then we have annually seeds and specimens which produce something new, and proper to exercise the talents of so learned and curious a botanist. But a gentleman of your benevolent disposition may in some degree soften the severities of the north, and Flora may, in some little disguise, by your assistance, for once appear amidst ice and snow. A few specimens preserved and dried in paper, and a few seeds, sent him as opportunity offers, with your curious remarks, would be to him all that I have allegorically hinted; and I will take care they shall be safely conveyed to him. * * * I am, with much respect, your affectionate friend,

P. COLLINSON.

DR. COLDEN TO MR. COLLINSON.

Coldenham, Nov. 13th, 1744.

DEAR SIR—I have your very kind letter of the 3d of September. If I have had the good fortune to gain your esteem in any degree, and thereby a share in your friendship, I shall think myself well rewarded for any thing I have done; and when I consider the trouble you take, and the concern you have for the little reputation I can hope to obtain, I may flatter myself that I have gained no small share in both. This encourages me to go on in communicating to you what thoughts have occurred to me, which I think can be any way useful in the world or amusing to you. I cannot deprive myself so far of all self-esteem but to hope, that a life of fifty years, a greater part of it spent in some kind of speculation or other, may produce something worthy your inspection at leisure hours, and therefore I shall continue to communicate some thoughts which have at times occurred to me, on every opportunity I shall have of writing to you. * *

The observation you made in your former, that we have in America many different species of plants and animals from those found in Europe or other parts of the world, though under the same climate, is certainly true; and I think we may likewise add, that we have different species of men. This naturally enough leads to the question you put, whether they be the effects of a different creation. But, dear sir, I dare not pretend to give any answer in a matter so high and out of my reach. It is a subject fit to be treated only by first rate philosophers and divines. I should be glad to know your sentiments on it.

I had the pleasure of seeing Mr. Bartram at my house this summer. It is really surprising what knowledge that man has attained merely by the force of industry and his own genius. He has a lively fancy, and a surprising memory and indefatigable disposition. I warned him with some concern against his exposing himself so much to the inclemencies of our climate as he does, and though he thought his constitution proof against it, * * * [As to your] garden I must, dear sir, entreat you to give us some share of that pleasure, by publishing a description of the plants in it, for I cannot hope to partake with you in any other manner. The use you make of it in admiring the infinite variety and beauty of the works of the Creator, comprehends

only one half of our religious duty, contained in Christ's first command to his disciples. It is properly the speculative part of religion which fits us for, and incites us to the practical part, or obedience to his second command, that of loving our neighbor as ourselves. The practice of the second command gives no less pleasure to a good man than the speculations of the first. You have a great deal, sir, in your power; that of being useful to almost one half of the world, to all America. We are very poor in knowledge, and very needy of assistance. Few in America have any taste of botany, and still fewer, if any of these, have ability to form and keep a botanical garden, without which it is impracticable to give complete characters of plants. In short, I may positively assert, that not one in America has both the power and the will for such a performance. Such a work is necessary; it will be a lasting benefit to mankind. It has all the motives to it which can incite a good man to any performance attended with trouble. I am sensible how much your time is taken up with business. But at the same time, I cannot doubt of your obtaining assistance from curious persons, perhaps much at leisure. I told Mr. Bartram of the design I have of entreating you: he was exceedingly pleased with it, and promises all the assistance in his power. * * * How much labor, and how many valuable collections in botany, more than in any other science, have been lost to the world by delay, and an endeavor of the author to complete his work before it appeared in public. I shall not presume to give my thoughts on any particular of the method to be observed in this work, because I have but a very superficial knowledge in botany; I shall only say, that I wish it to be in English, though I know that it is more difficult to do it in this language than in Latin. To encourage you in this, I enclose a description in English of two American plants, not as patterns, but to convince you what may be done, if I, who have so little skill in botany, have been able to make them tolerable. One of them I have for many years taken notice of as one of the signs of a fertile soil; but of late I cannot pass it without paying a particular regard to it. The reason of my choosing the other will appear in the description of it. But to return to the reasons I have for desiring your work in English:—1st. We have nothing in botany tolerably well done in English, so far as I have seen. 2d. It will thereby be more useful in America,

where the learned languages are little understood. 3d. It may set many who do not understand Latin, the ladies especially, on amusing themselves with this study, and thereby procure more assistance in bringing this knowledge to perfection. The ladies are at least as well fitted for this study as the men, by their natural curiosity, and the accuracy and quickness of their sensations. It would give them means of employing many idle hours, both usefully and agreeably. As I cannot doubt that Mrs. Collinson has the same taste of pleasures with you, I am fond to believe that she will with pleasure, save you some trouble in such a work as I propose. No doubt your correspondents inform you of the uses of several plants. I wish something of that may be added; for as most of the plants are new to us, the uses of them must be so likewise. Indeed a plant may be long known, and the use but a late discovery.

This brings to my memory what I have read in Allen's London Dispensatory, under the word *Ipecacuanha*, of a root from Maryland, which in most of the shops had been substituted in place of the true *Ipecacuanha*, the use of which was forbid by the College of Physicians, on Sir Hans Sloane's information, that it was a kind of *Apocynum*. No doubt the college was in the right to forbid the substituting of one plant in place of another; but I am not well satisfied with the reasons given by Sir Hans, as delivered in that book; viz. that it is a poisonous plant, being a kind of *Apocynum*. Now to this I object, that it is doubtful whether any of the plants which are now known by the name of *Apocynum*, be really the *Apocynum* of Dioscorides, by whose authority alone our *Apocynums* are branded, so far as I know, with the character of poisons. Again: supposing Dioscorides' plant to be truly an *Apocynum*, it does not follow that all the species in America ranked under that genus are in like manner poisonous. Dioscorides says, that his *Apocynum* has a very offensive smell: I know an American species whose flowers smell very agreeably; and may not their virtues likewise differ as much? I think we have strong reasons to judge, that the kind of *Apocynum* substituted in place of *Ipecacuanha* cannot be poisonous, otherwise it could not so generally have taken its place. Sir Hans likewise affirms, that the roots of a kind of *Apocynum* are commonly vended in New Spain for *Ipecacuanha*; if so, I doubt the greatest quantity of *Ipecacuanha* in the shops is from

thence. I have inquired of Mr. Bartram and others, to discover this Maryland Ipecacuanha; but can discover no roots under that name but two, both of them taken notice of by Mr. Clayton in *Gronov. Flora Virgin.* Neither of them can be the plant substituted for Ipecacuanha; because the one hardly works with double the dose of the true Ipecacuanha, and the other (an *Esula*) works violently with half the dose. You will oblige me by describing the species of *Apocynum*, substituted in place of Ipecacuanha, as Sir Hans affirms, or whatever other American plant it be.

I have presumed, I am afraid, too far upon your time and patience; but when I consider that I am grown old before I had the good fortune of any acquaintance with you, and that I can have but few opportunities of continuing it, and that only for a short time, I cannot forbear making the most I can of the opportunities granted me, and beg you will excuse, sir, * * *

MR. COLLINSON TO DR. COLDEN.

London, April 26th, 1745.

MY DEAR FRIEND—I did not expect that I should have found any leisure to answer your kind letter of the 8th of December last; but I will find time to thank you for the perusal of your papers to Dr. Gronovius, which I read over and over, and was much pleased with your reasons and objections; [which] are of such weight as must affect the Linnæan system, and prevent its being universally received. Tournefort and Ray, in my judgment, are much preferable. Take this in general. I wish I could be more particular. I really wonder at your proficiency in so short a time. I transmitted those papers by a safe hand to Dr. Gronovius, who writes many curious remarks on the things sent by J. Bartram, in distinct pages. Could you see them, they would I am sure give you entertainment, and put you in a regular method for future enquiries in some matters. I really don't know such another knowing, indefatigable man, as Doct. Gronovius.

Your brother sent me a letter for you, complaining he had not heard from you, which I enclosed early in the spring to J. Bartram, by Capt. Bream, who I desired to forward it to you.

I am glad to hear of the Philadelphia society. I certainly think it cannot labor long when such wonders are all around

them, ready brought forth to their hands, and to which we are great strangers; but because you see them every day, they are thought common and not worth notice.

Hitherto I have wrote only to blot paper; but now I tell you something new. Doct. Knight, a physician, has found the art of giving such a magnetic power to steel, that the poor old loadstone is put quite out of countenance; his steel magnets act on the needles, and transmit their power to knives, &c., as the loadstone. But he has also shown a secret on the loadstone not known before, by increasing its attractive power to a greater degree, and can at pleasure change the poles how he pleases. Take these examples:—A loadstone of a parallelopiped form he made the opposite end south poles, and the middle quite round all north poles. In another flat stone he made the opposite ends north poles, and the opposite sides south poles. In another loadstone of an irregular flat shape, he made half of each of the flat surfaces a north pole, and the other half a south pole, so as that the two half surfaces opposite each other, should be of a contrary denomination, with many other changes and varieties, showing he had the power to impress the faculty of either pole many parts of the loadstone, with as much ease as a loadstone will influence a needle. I am yours,

P. COLLINSON.

Dr. Gronovius hopes you will continue your remarks, and send him seeds of any of your vegetable productions.

The subjoined postscript to a later letter of Collinson to Dr. Colden, will bring to mind the correspondence of this candid man with Linnæus on the same subject; (vide Smith's *Correspondence* of Linnæus; and this *Journal*, Vol. XL, p. 7.)

“Dr. Linnæus is now publishing his *Species Plantarum*, with many new-coined names, which will so puzzle the science of botany that it will be impracticable to comprehend it. The *Azaleas* he has turned into *Kalmias*; so that every book he prints will require a new edition of his *Nova Genera*, which is a grievous tax and imposition on the public.”

MR. COLLINSON TO DR. COLDEN.

London, June 9th, 1755.

I cannot let this ship sail without asking you, how it fares with you this troublesome time? Your situation makes me anxious

for you and your family. Crown Point I may call in your neighborhood: if we are so fortunate to take it, it will be well; but unless we can maintain it and support the country round it, it is probable the French Indians, as well as troops, may come to distress the country round it in revenge.

John Bartram's ingenious son William has sent a pretty map of the Drowned lands, including the mountains and a branch of the Delaware on one side, and North River and the Wallkill on the other; near which, between two rivers, you are pleasantly as well as securely settled, which may preserve you from sudden excursions. As inhabitants increase, the Drowned lands will by degrees be drained and become a most fertile spot.

J. B. has made many curious observations on all the country round, and the course of the rivers, &c. He says the limestone in the vale near the last run in the Wallkill, that is, between the Blue Mountains and Katskill Mountains, is composed of sea-shells, cockles, clams, &c.: but the most remarkable is below *Gosion*, [Goshen,] where the limestone has the most perfect cockle-shells that ever he saw. If any of these happen in thy way, I should like one or two specimens, as confirmations of the universality of the deluge; and seemingly not a great way from thy house are found the oddest kind of scollop-shells in stone that ever he saw: a sample of these will be acceptable. I have the pleasure to tell you that the *Saracenas* are now in flower, by planting them in moss, in artificial bogs. I had your cranberries fruited last year by the same method. * * * I am, my dear friend, truly yours,

P. COLLINSON.

Mr. Collinson's explanation of the occurrence of marine shells in rocks and strata elevated far above the sea, absurd as it now appears to us, was the prevalent, if not the undisputed hypothesis of that day. Dr. Colden's views, as briefly expressed in the following letter, are far in advance of the age in which he lived. Indeed, I suspect that the records of science, down to a considerably later period, will not be found to furnish an explicit statement on this subject so perfectly in accordance with modern geology.

DR. COLDEN TO MR. COLLINSON.

We have had a very extraordinary summer, the driest in the latter part of it and hitherto, that ever was known, at least these

forty years past since I came to America. I lost my fruit of all kinds by a frost the last day of May, and many likewise lost their rye, being in blossom at that time. There is something in cold and in frost which we do not understand. I suspect strongly that it rises from the ground, by [its] effects being so very different in different places at a small distance from each other, according to the difference of the soil and situation. The lowest situation and meadow grounds are generally most subject to frost. The difference of a few feet in height is often very sensible in the same farm. The most frequent frosts are in dry summers.

I have not met with any shells since I received your last; though I have frequently seen them near my house. Mr. Bartram some years since carried a considerable piece from my house: as soon as I can get any I shall send some to you. *These shells, and many other marine things found far within land and on the top of mountains, I think prove that those parts where these shells, &c. are found were once under water; but it does not prove that the face of the earth was at that time the same as it is now. I think the contrary, that it must be different now from what it was then, and that this difference probably has happened by great general earthquakes.*

In the bundle with the papers, I have mentioned there are some descriptions of plants by my daughter Jane, which I designed to have sent by a ship from hence to Holland, which sailed a few weeks since; but was prevented in sending them by the sickness of my youngest daughter. I am pleased that they go to you, that you may perceive how far she deserves encouragement, in giving such an example to others of her sex. Please to convey them with my letter to Dr. Gronovius, when you have a proper opportunity.

MR. COLLINSON TO DR. COLDEN.

Ridge Way House, Feb. 25th, 1764.

I am here retired to my sweet and calm old mansion, and from its high elevation look forty or fifty miles round me, on the busy vain world below; envying no man, but truly thankful for the undeserved blessings good Providence hath pleased to confer on me. With a pious mind filled with admiration, I contemplate the glorious constellations above, and the wonders in the vegetable tribes below. I have an assemblage of rare plants from all

quarters, the industrious collection of forty years. Some or other of them, all the year round and all the seasons through, are delighting my eyes; for in the depth of our winter, the plants from the Alps, Siberia, and the mountains of Asia, exhibit their pretty flowers and anticipate the spring; the Black Hellebore, with its large white flowers, the Aconite with its golden clusters—these show themselves before Christmas; for that reason the first is called the Christmas Rose. Primroses and Polyanthus, Wall-flowers, and some Violets, and single Anemones, flower all winter, unless a snow happens to fall, which is seldom. It seems a paradox, (considering our latitude,) to tell foreigners that vegetation never ceases in England. I am this instant come in from seeing your Skunk-weed; its early appearance and its singularly spotted flowers, attract the notice of every one. It hath been now a month in flower; by this you may guess the difference of seasons with you and us. But this winter (if it may be called so) is very different from all that has been remembered. We have had as mild and warm, but then, it hath been dry, sunny, and pleasant; whereas this hath been continued (I may say daily) rains: if a few frosty mornings, certainly rain at night, moist and warm, but attended with hurricane winds, and the air so beclouded it was rare to see the face of the sun. The consequences of such inclement weather hath been more shipwrecks and inundations than ever was known in one winter. It is very affecting to read the very deplorable accounts from time to time: the loss of sheep and cattle drowned, advances much the price of provisions; but, thank God, from the plenty of last year (though a bad harvest) our bread keeps under twelve pence a peck loaf, and we have been able to supply vast quantities to our indigent neighbors. I am assured some weeks eight or ten thousand quarters of wheat have been shipped off for France, Portugal, Spain, and Italy: this trade brings in great riches, being a surplus that we can spare without prejudice to ourselves. When I look back and consider the poor state of agriculture here in the last century, it affords a pleasure I cannot express, to see our extensive improvements made in this age. Then the city of London imported annually Polish wheat from Dantzic, (to the enriching foreigners,) to fill our granaries; for our culture of wheat was so sparing, that if a crop failed a famine was like to ensue. To prevent this terrible calamity, the city prudently sold it out one

year under another. But the Dantzic corn trade hath been long left off, and instead of buying, we annually sell to our neighbors.

As often as I survey my garden and plantations, it reminds me of my absent friends by their living donations. See there, my honorable friend, Governor Colden : how thrifty they look. Sir, I see nothing but two fine trees, a Spruce and a Larch. That is true, but they are his representatives. But see, close by, how my Lord Northumberland aspires in that curious Fir from Mount Ida : look yonder at the late benevolent Duke of Richmond ; his everlasting Cedars of Lebanon will endure when you and I and he are forgot : see with what vigor they tower away, how their stems enlarge, and their branches extend. But pray what are those Pines ? Novelties rarely seen ; that elegant one with five leaves is the Cembro Pine from Siberia : the other tall tree is the very long-leaved Pine of ten or twelve inches from South Carolina ; they stand mementos of my generous friend, the late Duke of Argyle. That gentle tree, so like a Cypress, looks uncommon : that is the Lycian Cedar ; the seed was given me by Sir Charles Wager, first Lord of the Admiralty, gathered in the Isle of Ivica, in his voyage to convey Don Carlos (the now king of Spain) to Naples. But those Balm Gilead firs grow at a surprising rate, it is pleasant to see : they renew a concern for my dear friend, Lord Petre ; they came young from his nurseries, with all the species of Virginia Pines and Cedars. That Fir that grows near them is remarkable for its bluish-green ; that was a present from my worthy friend, Sir Harry Trelawny : it is called the Black Spruce, he had it from Newfoundland ; it grows delightfully. Regard the variety of trees and shrubs in this plantation, as Mountain Magnolia, Sarsifax, Rhododendrons, Kalmias, and Azaleas, &c. &c. : all are the bounty of my curious botanic friend, J. Bartram of Philadelphia. And for these pretty Fringe trees, Halesias, and Stuartia, all great beauties, I must thank my friend John Clayton, the great botanist of America. How fragrant that Allspice ; how charming the Red-flowering Acacia, the great Laurel-leaved Magnolia, Umbrella Magnolia, and Lob-lolly Bay : these charming trees are the glory of my garden, and the trophies of that friendship that subsists between me and my very obliged friend, J. Lambol, Esq. of South Carolina.

Thus gratitude prompts me to celebrate the memory of my friends, amongst whom you have long claimed the respect and esteem of yours sincerely,

P. COLLINSON.

MR. COLLINSON TO DR. COLDEN.

London, Feb. 10th, 1768.

I had the pleasure of my dear friend's letter, with the packet for Lord Shelbourne, which was delivered. Now there is Lord Hillsborough appointed secretary for the colonies; for the future your application will be to him. We may now hope, as the colonies are his peculiar care, the public grievances will be redressed, yours in particular; so the sooner your application to him the better, and if it was conveyed by your friend, Sir Jeffrey Amherst, it may have more weight; for I have no acquaintance with him. * * *

I presume you have heard of the wonderful discoveries. Near the Ohio, about six hundred miles below Pittsburgh, and four from the river, is a great Licking-place: [here] George Crogan, Esq. found a great quantity of the great long elephant's teeth and bones. He sent over of these great long teeth or tusks six or eight, which I have seen and handled. Some about six feet long, and the same thickness as recent elephant's teeth of that size, and, what is remarkable, some are not in the least decayed: the ends cut off show as fine white ivory as recent ivory. Now is not this wonderful! A small tooth about two feet long, of a chestnut color, hath a fine natural polish, as if just taken out of the head of the young animal.

As there never were any elephants in America, neither could they subsist for the severe long winters where they are now found near the Ohio, what hypothesis can be formed to account for these being found there, under a bank on the sides of this great lick, where some portions of the bones and teeth lay exposed to view? (seven hundred miles from the sea.) Mr. Crogan believes, from the quantity of the bones and teeth, there could not be less than thirty animals. He sent the teeth to Lord Shelbourne and Benjamin Franklin. Portions of the like elephant's teeth found in Peru, were sent last year as a present to the Royal Society. Mr. Franklin talks of coming over by some of the summer ships: he is very well, and much caressed and admired here.

Pray give my kind respects to thy son David. I shall be greatly obliged to him for the information he intends me on the Rattlesnake. Any remarks on natural history will be very acceptable to your sincere friend,

P. COLLINSON.

P. S. I thank good Providence I have lived to see a pair of your great Moose-Deer's horns sent to the Duke of Richmond: there is not a pair in the British Museum, which is a great loss to that grand collection, which is the wonder of the world.

It was always said the great Deer's horns found in the bogs in Ireland, some ten feet from tip to tip, was the same as the great Moose-Deer's of New England and Canada. But this pair shows there is no affinity; but your Moose horns are very like the Elk of Germany and Russia; so that the animal that produced the Irish horns is not now known to exist in all your discovered world, and it is not in our own parts; but possibly it may have being in Terra Australis, *or no where*: but that is not agreeable to the plan of Providence.

We have no room left for the letters of Dr. Garden of South Carolina; which, however, are for the most part so much occupied with private and colonial affairs, that they do not possess the same scientific interest as his published correspondence with Ellis and Linnæus. The following letter gives an account of his visit to the elder Bartram, at his well-known garden near Philadelphia.

DR. GARDEN TO DR. COLDEN.

Philadelphia, Nov. 4, 1754.

HONORED SIR—I cannot help, once before leaving Philadelphia, begging permission to intrude on a philosophic hour, in troubling you with the perusal of a few lines, according to my promise when I had the pleasure of seeing you at New York. Since my leaving that place I have met with very little new in the botanic way, unless your acquaintance Bartram, who is what he is, and whose acquaintance alone makes amends for other disappointments in that way. I first waited on him with Gov. Tinker and Dr. Bond, whom he received with so much ease, gaiety and happy alacrity, and invited to dine with so much rural vivacity, that every one were agreeably pleased and surprised. Unluckily Gov. Tinker had engaged some company to be with him that day, else we should have taken part of his botanic treat, which he seems fully designed to have some day this week.

One day he dragged me out of town, and entertained me so agreeably with some elevated botanical thoughts, on oaks, ferns,

rocks, &c., that I forgot I was hungry till we landed in his house about four miles from town. There was no parting with him for two days, during which time I breakfasted, dined and supped, slept, and was regaled on botany and mineralogy, in which he has some excellent notions and grand thoughts. His garden is a perfect portraiture of himself; here you meet with a row of rare plants almost covered over with weeds, here with a beautiful shrub, even luxuriant amongst briars, and in another corner an elegant and lofty tree lost in common thicket. On our way from town to his house, he carried me to several rocks and dens, where he showed me some of his rare plants, which he had brought from the mountains, &c. In a word, he disdains to have a garden less than Pennsylvania, and every den is an arbor, every run of water a canal, and every small level spot a parterre, where he nurses up some of his idol flowers, and cultivates his darling productions. He had many plants whose names he did not know, most or all of which I had seen and knew them; on the other hand, he had several I had not seen, and some I never heard of. To-night I shall pay him a visit along with a Jamaica doctor; we set away after dinner, and design to remain all night with him.

I shall be glad to hear of Miss Colden's improvements, which no doubt increase every day, and may we again be surprised with more than a *Dacier*, even in America. Messrs. Wragg and Cleland left this place last Monday; we shall leave it in ten days. I shall expect the favor of a line from you soon, by the time I get to Charleston. I beg leave to offer my compliments to Mrs. Colden and your good family, and remain with great esteem, honored sir, your most obliged and very humble servant,

A. ALEXANDER GARDEN.

Dr. Colden was appointed lieutenant governor of New York in 1761; and performed the duties of governor for a great part of the time, until 1775, when by the return of Governor Tryon, he was relieved from official cares. He then retired to a seat on Long Island, where he died on the 28th of September, in the 89th year of his age. "For the great variety and extent of his learning, his unwearied research, his talents, and the public sphere which he filled, Cadwallader Colden may be justly placed in a high rank among the distinguished men of his time."

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